

Appl. No. 09/545,785

REMARKS

This is in response to the Office Action of 18 March 2004. Claims 1-9 and 11-21 are pending in the application; Claims 1-6, 8-9, and 11-21 have been rejected; and Claim 7 has been objected to.

Claim 7 has been cancelled; and Claims 1, 8, 13, 14, 18, and 21 have been amended.

No new matter has been added.

In view of the amendments above and remarks below, Applicants respectfully request reconsideration and further examination.

About The Invention

The present invention relates generally to capacitor structures suitable for use in integrated circuits, and compatible with semiconductor manufacturing processes. The present invention relates more particularly to capacitor structures for integrated circuits, which capacitor structures include a plurality of parallel conductive screen, or mesh, plates, where the plates are substantially perpendicular to the substrate of an integrated circuit, and where alternate plates are electrically coupled to opposite terminals of the capacitor formed by the plurality of screen plates. Each screen, or mesh, structure that makes up the interdigitated elements of the capacitor structure includes what may be viewed as a plurality of beams and a plurality of columns. The beams include vertically stacked, spaced apart, horizontally oriented, conductive lines. Each column includes vertically aligned vias electrically connecting each of the stacked beams to each other. Only dielectric material is disposed between the vertically oriented, interdigitated plates of the capacitor structure. The dielectric material also occupies the openings, or spaces, of the screen-like capacitor plates. By adding vias to each coplanar stack of conductive lines, the effective surface area of each vertically oriented parallel capacitor plate is increased by the surface area of the sidewalls of the vias.

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Allowable Subject Matter

The Examiner has indicated that Claim 7 would be allowable if rewritten in independent form including all the limitations of the base Claim and any intervening Claims.

Claim Objections

The Examiner has objected to Claim 7 as being dependent upon a rejected base Claim.

The Examiner has objected to Claims 13, 14, and 21 for informalities. The Examiner has suggested replacing the term "screen" with the term "mesh"; and has required appropriate correction.

By this amendment, Claim 7 has been cancelled; and Claims 13, 14, and 21, have been amended to use the word "mesh" in place of the word "screen", as suggested by the Examiner. In view of these amendments, Applicants respectfully submit that the objections to the Claims have been overcome.

Rejections under 35 USC 103(a)

Claims 1-6, 8-9, and 11-21 have been rejected under 35 USC 103(a), as being unpatentable over Ng, et al., (US Patent 5,583,359).

With respect to Claim 8, Applicants note that Claim 8 depended from allowed Claim 7 and therefore should not have been rejected. However, as described in greater detail below, Claim 8 has been amended to depend from Claim 1, which in turn, has been amended to include the limitations of allowable Claim 7.

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Ng, et al., disclose interdigitated, multi-level capacitor structures. Applicants respectfully submit that Ng, et al., do not disclose the vertically oriented parallel plate structures, which resemble screens or meshes, wherein only dielectric material is disposed between these plates. Applicants further submit that Ng, et al., do not suggest the inventive structure set forth in Applicants' amended Claims.

Independent Claim 1 has been amended to include the limitations of allowable Claim 7. In view of this amendment, Applicants respectfully submit that the rejection of Claims 1-6, 8-9, and 11-12 have been overcome.

Independent Claim 13 has been amended to use the word "mesh" rather than the word "screen" as suggested by the Examiner. The limitation regarding parallel vertically oriented mesh structures having only dielectric disposed between those parallel vertically oriented mesh structures, as recited in Claim 13, distinguish the claimed structure from Ng, et al., in the same way that allowable Claim 7 is unobvious in view of Ng, et al. In view of the amendment and remarks, Applicants respectfully submit that the rejection of Claims 13-16 have been overcome.

Independent Claim 18 has been amended to recite that each parallel capacitor plate comprises a mesh structure. The limitation regarding parallel mesh structures, which have only dielectric disposed between those parallel mesh structures, as recited in Claim 18, distinguish the claimed structure from Ng, et al., in the same way that allowable Claim 7 is unobvious in view of Ng, et al. In view of the amendment and remarks, Applicants respectfully submit that the rejection of Claims 18-21 have been overcome.

Comments on Statement for Reasons of Allowance

The Examiner has stated that Claim 7 would be allowable if rewritten in independent form including the limitations of the base Claim and any intervening Claims. Additionally, the Examiner states that Ng, et al., appear to be the closest

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prior art reference, and that this reference teaches the claimed structure, except a capacitor plate structure comprising a mesh structure. The Examiner concludes therefore the cited prior art does not render the claimed structure obvious.

Applicants thank the Examiner for his analysis, and agree that the claimed structure is not disclosed, suggested, or motivated by Ng, et al. Applicants desire to note other structural differences between the claimed structures and Ng, et al. For example, independent Claims 1, 13 and 18, each recite the limitations which require that only dielectric material be disposed between the vertically oriented mesh structure capacitor plates. Such an arrangement is not disclosed by Ng, et al.

Conclusion

All of the objections and rejections in the outstanding Office Action of 18 March 2004 have been responded to, and Applicants respectfully submit that the pending Claims 1-6, 8-9 and 11-21 are now in condition for allowance.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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